



Pacific Island Network Quarterly



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YOU CAN HEAR ME NOW

Pg. 8



National Park Service

U.S. Department of the Interior

Pacific Island Network

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The National Park Service (NPS) has implemented natural resource inventory and monitoring (I&M) on a servicewide basis to ensure all park units possess the resource information needed for effective, science-based management, decision-making, and resource protection.

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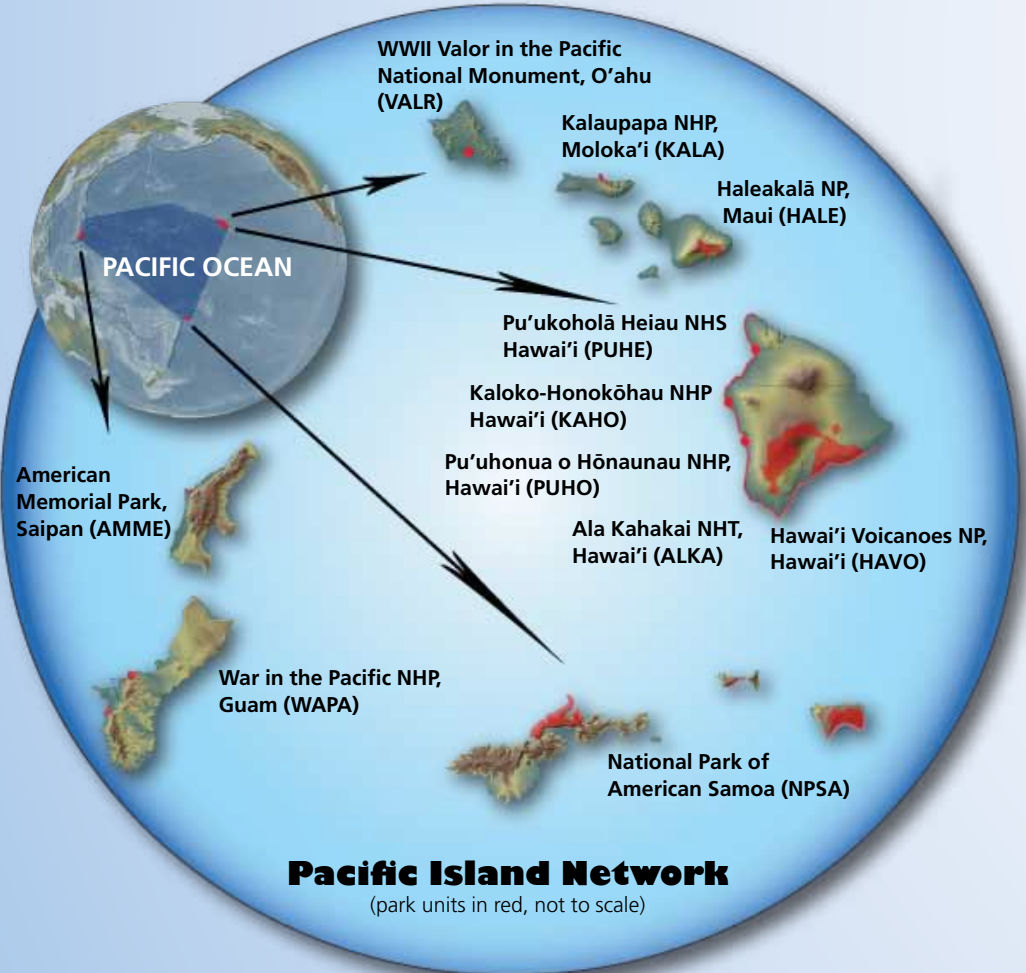
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NOTE: Unless indicated all photos and articles are NPS.

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	April	May	June
Anchialine monitoring			
Invasive plants		AMME	
Vegetation communities	WAPA, AMME	AMME	
Water quality	HALE, KALA, NPSA West Hawai'i Parks		WAPA Marine
Stream animals			
Ground water			
Benthic marine			WAPA
Marine fish			WAPA
Vegetation mapping	NPSA, HALE	HALE	HALE
Climate (on-going)	All Parks -----	-----	-----



Letter from the Editor

The Program Manager has left the building, but the PACN continues to come into its own.

Transitions. You'd think we'd be used to them by now. The Pacific Island Network (PACN) has just bid farewell to Program Manager, Dr. Greg Kudray. Greg served as the program's third official leader in its young life. The PACN is only about 13 years old, after all. Just like any program emerging from its tweenage years, we've had to figure out who we are and how we fit in. We have undoubtedly felt a bit awkward through the years.

During Greg's six years with the PACN we made strides in many programmatic areas. Most of our Vital Signs monitoring protocols are complete or near completion. Field work has proceeded full bore. And the monitoring reports, certainly our primary raison d'être, are starting to materialize.

The vegetation program really blossomed during Greg's tenure thanks to his vegetation program push, and a lot of heavy lifting and deep thinking by program Botanist, Ali Ainsworth. With a supporting cast of vegetation staff and the excellent help of the parks, we've competed two vegetation monitoring protocols (focal plant communities and established invasive plants) in several parks, with more in progress. Two additional vegetation monitoring protocols are also in the works. And the vegetation mapping project, the largest single inventory project in the history of the PACN, is nearing completion.

Greg also put a lot of energy into our GIS and science communications programs. Of course these programs existed before he came into the picture, but both disciplines are far more robust than before his tenure. Along with data management, these program areas have been uniquely augmented to try to fulfill the special needs of the parks in the network. Our scientists nobly capture and analyze the data, but it's up to Data Manager Kelly Kozar, GIS Specialist Scott Kichman, and yours truly (the science communications guy) to make sure that what our scientists are doing is accessible, in its many forms, to the parks and public. All three of these programmatic areas have grown and increased their integration in the parks under Greg's direction.

Perhaps the three most established programmatic areas (apart from all the data mining and inventory work during the early years) that preceded Greg's arrival to the PACN were the aquatic, marine, and landbird monitoring efforts. Under Greg's watch (and in some cases before), all three program areas finalized most of their monitoring protocols and have progressed to officially collecting multiple years of monitoring data. Most notably, during the past year all three of these program areas have churned out at least one technical report (see "raison d'être"). Three landbird monitoring reports were completed during Greg's tenure through a successful and productive partnership with the Research Corporation of the University of Hawaii. Now, Marine Ecologist Sheila McKenna, Aquatic Ecologist Dave Raikow, our counterparts at the parks, and the professionals we work with at the University of Hawaii will continue to develop the program and undertake the long-term monitoring tasks ahead.

From a greatly enhanced safety regime to an improved understanding of our own program's structure and image, Greg ushered us into the next stage of our collective growth. Our next Program Manager will embrace the challenge to guide us through our figurative adolescence. Let's embrace this new transition together in our 13th year, because before you know it we'll be asking to borrow the keys to the proverbial car.

—Cory Nash, NPS
PACN Quarterly Editor

Taking it to the Streets - Ok. Maybe just the overlooks and lecture halls.

Unless you've just done something monumental (or viral), notoriety may elude you. So as an important, albeit behind-the-scenes, cog in the NPS machine we sometimes have to seek out our audiences in unconventional venues.



Hawai'i Volcanoes NP included the PACN in its 2014 Certified Guide Training program. Tour operators, guides, and others join in this periodic educational experience to learn about park history, culture, and resources. This year, the PACN introduced the I&M Program and discussed park natural resources on five separate occasions with several hundred eager guides at the park's Kealakomo Overlook. Since these audiences have much larger audiences of their own, a communications multiplier effect on park resources and NPS monitoring will ideally result.



When approached by the University of Hawaii - Hilo Geography Department to be a guest lecturer, PACN GIS Specialist Scott Kichman seized on the opportunity to share vegetation mapping inventories on campus with students on four occasions. This connection not only strengthened ties between UH-Hilo and I&M, but it introduced the NPS I&M Program to a group of future local conservation leaders.

Featured Staff

Elizabeth Urbanski was born and raised in San Mateo, CA and went to college at UCSD in San Diego. She has been working for the NPS since 2003, and has worked in Utah, Hawaii, Washington, California, and Colorado. She started doing field work for the PACN in 2012 for the vegetation program.



Vegetation crew in Haleakalā NP. From left: Elizabeth, Michelle, Mara, and Monica

Michelle Osgood is native to the swamps of North Central Florida. As she romped around in the mud, an appreciation for the natural world grew in her, as well as a need to protect it. This, combined with a yearning for the ocean, brought her to Eckerd College, FL where she earned a degree in Environmental Policy in 2006. Since then, she has been living the gypsy life, working as a seasonal field botanist in Arizona, California, Montana, Florida, and most

recently on Maui. She is excited to be part of the I&M team!

Mara MacKinnon is from Bisbee, Arizona where she learned to love the outdoors and the native flora. She began learning field botany as an intern with the USGS after graduating with a B.A. in Economics/Environmental Studies from Macalester College, MN. Her fascination with vegetation and its role in ecosystems continues to grow with her knowledge of plants. In four years of field work, she has 'botanized' in the meadows of the Sierra Nevada Mountains and in the Mojave and Sonoran Deserts. She is thrilled to have the unique opportunity to be working on the vegetation crew at Haleakalā NP.

Monica Lomahukluh grew up in the mountains of Montana. She graduated from the Univ. of Montana College of Forestry in Missoula. She became a research assistant for various professors and landed a job working in Yellowstone NP as a botanist during the summers. This is her first time in Maui. "I came with the expectation to learn about the ecosystem, this has definitely blown my mind," she waxed.

Bryan Everett joined I&M as an RCUH cooperator with the vegetation mapping team. He has a degree in marine biology from the Univ. of Massachusetts, and has been living in Volcano, HI for the past four years. He has a professional background in biotechnology and pharmaceuticals, and has worked on climate change studies with the USGS. When he is not working, he enjoys spending time with his daughter Riley, and watching the Red Sox win the World Series.



PACN Communications News

PACN Communications News

NOW ANYONE CAN EASILY GENERATE A LIST WITH ALL OF THE SPECIES KNOWN IN ANY PACN PARK!

Ever wonder what kinds of birds have been officially documented in your park? Now you can search for birds, plants,

fish, and more in any PACN park from one easy location. Go to <http://science.nature.nps.gov/im/units/pacn/species.cfm>.

You'll be astounded at the ease and power of this species list generator tool. Happy searching.

PACN Communications News

THE NEW 2013 PACIFIC WEST REGION I&M PUBLICATIONS LIST IS ALL YOURS

If you are the type of person who wants to keep up with the health of natural resources, but doesn't have the time to dig for reports... We've



got just what you need. Contact the PACN for your copy of the FY13 PWR I&M Publications List today.

NEW TOUCHSCREEN AT KALOKO-HONOKŌHAU NHP BRINGS MONITORING SCIENCE TO THE MASSES

On March 4, 2014, a touchscreen was installed at the KAHO Visitors Center, marking the 3rd such public interface at PACN parks since 2012. KAHO joins Haleakalā NP and Hawai'i Volcanoes NP in promoting the public awareness of monitoring

science in the parks by hosting these touchscreens featuring I&M videos. Which park will be next?



PACN'S 2014 FESTIVAL GAME IS ALL ABOUT THE STRUGGLE FOR TERRITORY

In April, 2014, the PACN will debut their newest game to be played at park festivals, county and Earth day fairs across Hawaii to teach visitors about natural resources. This year's game pits crime committing invasive plants against native plant "park deputies" in an epic struggle to gain control of a

lava field. "Park Showdown" as it's called, joins a suite of popular festival games like the "Ō'opu Race" and "Be a Responsible Spearfisher".





I. Converges with M. on the Kalaupapa Coast to Make a B.L.T.

Two plant monitoring protocols combine with a vegetation mapping inventory to create a more robust understanding of the resources.

Bacon is delicious on its own. But when you add tomato to the bacon, the salty smokiness mixes with the tangy sweet acid of the fruit to make something even better. Add toast, lettuce, and mayo, and you've just created a taste sensation which is undoubtedly more scrumptious than its individual parts.

The Inventory & Monitoring program (I&M) monitors natural "vital signs" like the Focal Terrestrial Plant Community (FTPC) and Established Invasive Plant Species (EIPS). Though these projects

are each designed to serve a specific purpose, they can be used in tandem to achieve an even better understanding of the plant communities. Sprinkle on top a snapshot of another aspect of park resources like the recent vegetation mapping inventory, and you end up with a bona fide synergy of science. The B.L.T. Effect, if you will.

The detail achieved by bringing together different components of plant community composition can be extremely valuable to resource managers, and help with evaluating the health or status of natural resources of concern. In the future, I&M plans to supplement these protocols with other vital signs such as Early Detection of Invasive Plant Species and Focal Plant Species monitoring.

Focal Terrestrial Plant Community Monitoring
To conduct this monitoring protocol, crews travel to

the backcountry areas of Pacific Island Network (PACN) national parks to survey the vegetation of focal plant communities. These include wet forests, subalpine shrublands, coastal communities, limestone forests, and a mangrove forest. Specific areas within these communities, or "sampling frames", were determined by park staff based on vegetation, geography and other factors. More importantly, sampling frames were assigned to areas that are still considered to be relatively intact ecologically.

Monitoring FTPC consists of determining all native and non-native species present in a 20x50m (forests and subalpine shrublands) or 10x20m (coastal) plot. Crews also take readings on the substrate and understory cover, then count and take measurements on seedlings, shrubs, and trees. Depending on access, vegetation diversity and density, this process can be fairly quick or take multiple days for a single plot. Monitoring is repeated every five years at each park to provide long-term plant community data, and eventually trends.

[Speed Science Video](#)



A vegetation monitoring plot in the coastal strand of Kalaupapa National Historical Park

Some areas (above and background) of the coastal strand plant community are dominated by native plants like 'akoko (*Euphorbia degeneri*), 'ilima (*Sida fallax*), hinahina (*Heliotropium anomalum* var. *argenteum*), 'ākulikuli (*Sesuvium portulacastrum*), and naupaka (*Scaevola taccada*). Invasive plants, like Bermuda grass (*Cynodon dactylon*) are scattered throughout the coast, and threaten to displace native species like mau'u (*Fimbristylis cymosa*; photo to the right).

Established Invasive Plant Species Monitoring

EIPS monitoring is conducted within the same sampling frames as FTPC – areas that are considered to be relatively intact. To monitor this vital sign, crews walk transects and estimate the types and amounts of all non-native species found in contiguous plots along the way. While the length of transects vary depending on where we are, each transect is 5m wide. Plots along the transects are either 10x5m or 20x5m, depending on the situation.

Following the same schedule as FTPC monitoring, EIPS transects are repeated every five years for each PACN park.

Vegetation Mapping Inventory

In 2008, I&M crews, contractors, and cooperators started working together to produce detailed vegetation classification maps for each PACN park. This process begins with crews painstakingly documenting all vegetation within (a lot of randomly generated) 400m² circles. Contractors then combine these data with satellite imagery to produce draft maps of plant associations scattered across the parks. Afterward, crews conduct accuracy assessments before final maps and reports are produced (see [The Whole Ground Truth](#)).

Vegetation maps are a great tool for resource management in their own right. These inventories provide a snapshot of the vegetation across the parks. They can help managers identify areas of concern.

Bringing it all Together with Thematic Maps... A Better Sandwich

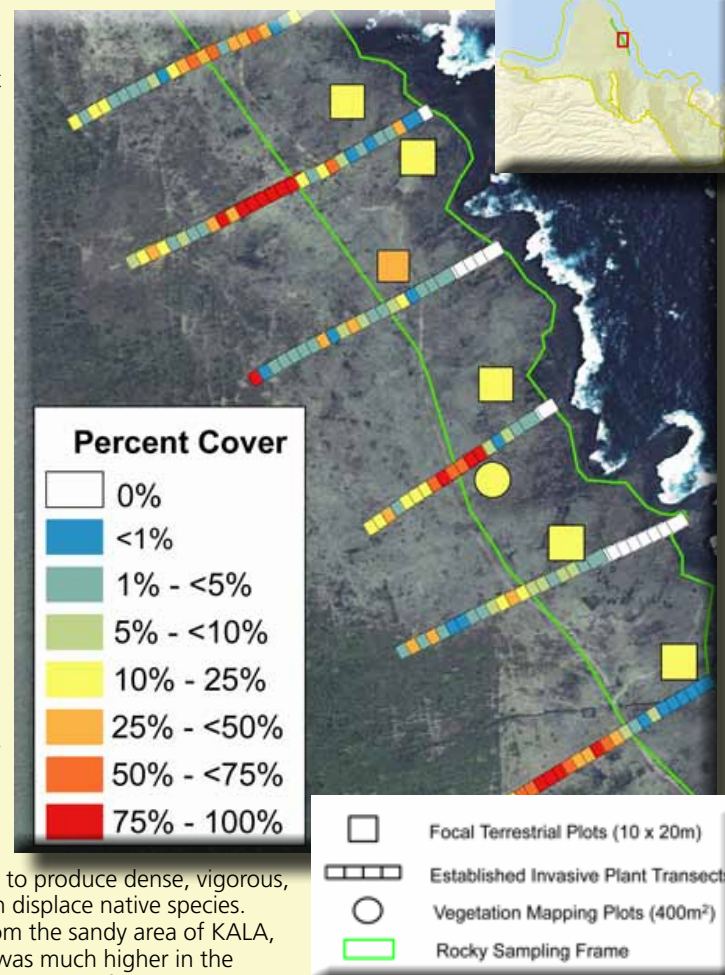
The meat of the story is in the thematic maps that are created from a combination of plant monitoring and vegetation inventory data. These maps are made to display specific themes or data of interest. A theme that targets non-native plant species, for example, can help provide insight to the "health" of areas within the parks.

We combine data from FTPC monitoring plots, EIPS transects, and vegetation mapping plots to create thematic maps (e.g. map below) for targeting non-native species cover in the rocky and sandy sampling frames of the Kalaupapa Coast. These maps will be published with the Kalaupapa Coastal Strand EIPS monitoring report (available soon) and focus on species of concern to the park, especially those that have the ability to displace native vegetation. By bringing together FTPC, EIPS, and vegetation inventory data we can provide resource managers with a more detailed picture of how these potentially damaging non-native species are spreading in relatively intact plant communities. The result is stronger than the sum of its parts... not unlike a good B.L.T.

–Melissa Simon, NPS Biological Technician
& Cory Nash, NPS Science Communications

Rocky sampling frame for *Cynodon dactylon* cover (map)

If you've ever visited or seen pictures of the Kalaupapa NHP (KALA), you'll recall that the southeastern coast is covered in native and non-native grasses and herbs. Bermuda grass (*Cynodon dactylon*) was the most frequent and abundant non-native species, according to the EIPS monitoring data. This map shows a section of the rocky sampling frame, where we mapped Bermuda grass cover for 15 FTPC plots, 16 EIPS transects, and two vegetation mapping plots. Unlike other PACN parks, EIPS monitoring transects extended beyond the sampling frame boundaries into a "buffer" area to better monitor encroaching non-native species. Analyses from EIPS data show that Bermuda grass was relatively widespread in the rocky area. The frequency and cover of this species was similar between the sampling frame and buffer area. Bermuda grass may be a species of concern because of its ability to produce dense, vigorous, low-growing strands that can displace native species. These results are different from the sandy area of KALA, where Bermuda grass cover was much higher in the buffer area than in the sandy sampling frame.





New Radio and Cell Phone Maps

I know you can hear me now!

"Dead zones" made less creepy sounding

One of the most important safety components to any field operation is communication. The accuracy assessment phase of vegetation mapping (see [The Whole Ground Truth](#)) involves sampling the far reaches of a park, and the Inventory & Monitoring program (I&M) saw this as an opportunity to bolster park knowledge of radio and cell phone reception across three parks: Hawai'i Volcanoes NP (HAVO), Kalaupapa NHP (KALA), and Haleakalā NP (HALE —map in development).

I&M made hundreds of radio and cell phone checks with dispatch and park staff, and recorded the receptivity (can they hear me?) of each one. These data were classified by reception quality and exported into spatial point data. In addition to the field data, image modeling software was used to create a viewshed analysis of radio repeater and cell towers surrounding the parks. This was done by using the exact locations and heights of radio repeaters and cell phone towers to model where on the ground these towers actually propagated radio and cell waves. These data (plus elevation components) were then correlated with the field data to develop visual maps of receptivity.

Dispatch, emergency responders, and field crews can use this information to better plan for work in areas with known dead zones, allowing them to develop thorough contingency plans and employ alternative communication (e.g. satellite phone) devices as needed.

As with any modeled, digitized information, there are likely to be gaps in information and potential discrepancies in exact locations. There were, for example, areas within the parks where no field data was collected. These areas were assumed to have fair reception if the viewshed analysis designated the areas visible to the towers. Also, due to the limitations in GPS receptivity, or in densely vegetated areas which may scatter GPS signals, positional error may be more significant.

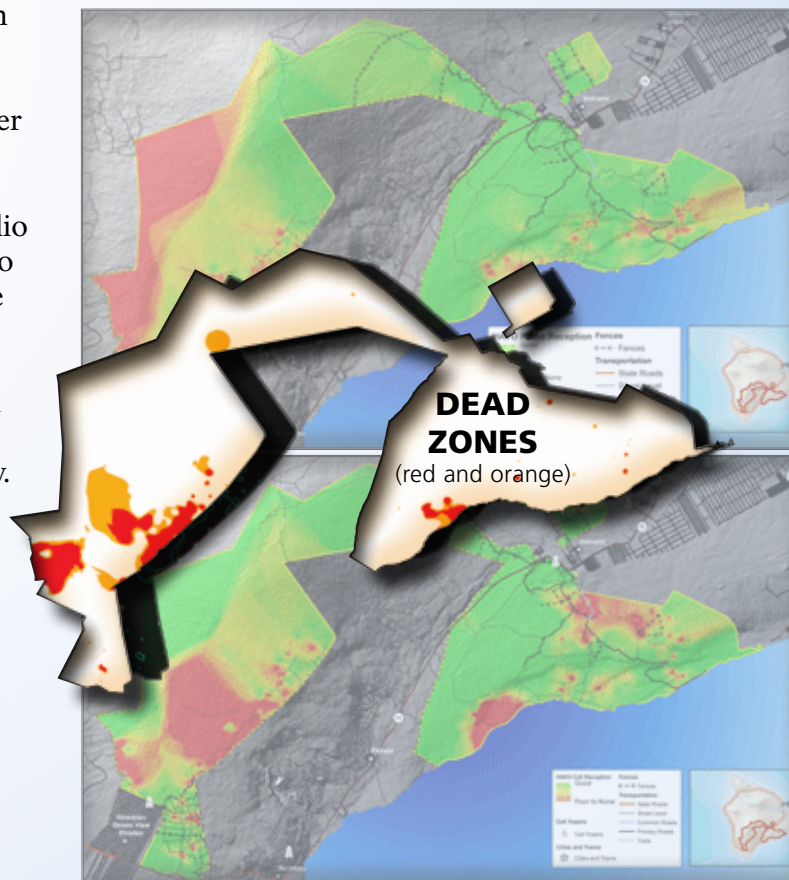
Likewise, cell phone towers and radio repeaters may be adversely affected by weather or experience technical interruptions. These maps are intended to provide communication information for all

persons in the field, yet we need to be aware that variables in the field may affect receptivity. We encourage all parks to test the maps, take more sample sites and improve these maps by notifying us of discrepancies or additional data. New data can be easily appended into the modeling software to update the maps.

Development of these maps is just another tool to enhance safety through better communications for everyone working in the parks.

—Kathy Akamine & Meagan Selvig,
RCUH Biological Technicians
—Scott Kichman, NPS
GIS Specialist

For a map, please contact
scott_kichman@nps.gov



HAVO RADIO Coverage Map

The red and orange indicate poor receptivity for radio (top) and cell service (bottom).

As you can see, some areas like NW Kahuku (left side of the maps) has strong cell but poor radio receptivity.

The white "dead zones" graphic in the middle highlights areas where neither radio nor cell phones work. An alternative form of communication is recommended while working in these areas.

HAVO CELL Coverage Map